Exhibit 10

Seeking Alpha α

Sequenom CEO Hosts 2011 Analyst and Investor Day

Executives

Harry F. Hixon Jr., Ph.D. – Chairman, CEO

Ron Lindsay, Ph.D. – Director and EVP R&D

Paul Maier, CFO

Bill Welch – SVP Diagnostics

Allan Bombard, M.D., CMO

Dirk van den Boom, Ph.D., SVP R&D

Analysts

Sequenom, Inc. (SQNM) 2011 Analyst and Investor Day Conference Call November 14, 2011 2:00 PM ET

Harry F. Hixon

Hello. My name is Harry Hixon. I am Chairman and CEO of Sequenom and I want to welcome everyone, and thank you very much for coming today to our Analyst Day. I also want to thank NASDAQ for hosting us today and making this room available. They're very kind a generous to provide us with [inaudible] this morning as well.

As you know, we launched MateriT21 on October 17th on the day we all [inaudible] medicine article that appeared online. We had a call in which we announced we were launching the test. That call was obviously focused on the details of the trail.

In the interim, [inaudible]. We've had a lot of questions from you and from others and what we do is [inaudible] team from San Diego and we have an Analyst Day presentation. We make the full presentation on [inaudible] MateriT21. And afterwards, we will answer all your questions.

So that's the purpose of today, and thanks again for coming.

So this is our Safe Harbor statement that we always start everything off on. I'm sure you're all familiar with it. Basically, this is the list of the types of questions we've sort of categorized. We've come prepared to try and answer these with our presentation and then we'll also be prepared to answer any other questions that come about. The categories are fairly simple. The physician adoption and the intended use, what's our commercialization strategy. How does reimbursement play into this timing in the managed care process. The test units and the units from a volume ramp that we [inaudible]. Financial modeling and results from some of our [inaudible] reports by our accounts to account for revenues. A lot of detail on the clinical design in our data and some comments on the FDA regulations and LDT regulations, and then some mentioning of our Intellectual Property Rights.

So those are the major topics where I think I wanted to cover. And we also, obviously, [inaudible] Q&A. So we'll have the presentation and we'll roll forward. It's being webcast and after that, we will break very quickly and then we'll go to the Q&A. The Q&A will not be on the webcast.

So I'd like to introduce the team that comes from San Diego here. Obviously, I'm Harry Hixon. So Ron Lindsay, would you please stand. Ron Lindsay is the Director of the company and has been for over seven years. He's our Executive Vice President for R&D. Paul Maier, CFO. Bill Welch is Senior Vice President for Diagnostics. Allan Bombard is our Chief Medical Officer. Dirk van den Boom, who's Senior – he's the Vice President now, I guess, for Research. We

don't have his title on there, do we? Okay, good.

As you know, the company's divided in two basic operating segments; Genetic Analysis business and Molecular Diagnostics, through which the core business is the Genetic Analysis business based on our proprietary MassARRAY spectrometer. Basically, this business is transitioning from academic research, it's initial use, into now translational applications and clinical diagnostics. We see a lot of our new and more interesting molecular diagnostic opportunities from this part of the business. So this feeds – one of these businesses feeds into the other.

We had a good year, last year, 2010, 47.5 million and through the first three quarters this year, we've had a nice increase, we're at 40.4 million.; not quite 100 million shares outstanding, and obviously we're headquartered in San Diego. We have a CLIA lab in Grand Rapids, Michigan and we have sales representatives throughout the world.

The Sequenom Center for Molecular Medicine is a wholly-owned CLIA laboratory and we have two locations; one in Grand Rapids, Michigan. There, we preform, or we offer out Cystic Fibrosis Carrier Screening, our Fetal RhD test, and our Age-Related Macular Degeneration test. All those test are on the MassARRAY platform.

The current LTD that we're offering in San Diego is our proprietary, noninvasive LDT to detect trisomy 21, brand name there is MaterniT21. You'll hear a great deal about that today.

These are – I'm going to show you our corporate goals that we showed publically first at an investor conference the second week of January and we put these up – all these goals. We said, okay, this is what we want to accomplish in 2011.

We actually done some of the things in 2010 and we done – we met all those goals. I just want to show you how we did against those goals in 2011.

For the company, Sequenom incorporated – these were our goals and we met all of our goals for the corporation. We actually met them by the end of October. So we had a year's goals finished in 10 months.

For Sequenom Center of Molecular Medicine, we had a lot of goals that were related to T21, the clinical, commercial and also for AMD launch and we met all of those as well.

And it is our plan in January that we'll have goals for 2012 and they will be aggressive goals that we have as our corporate goals. Also, much of the corporate bonus plan derives from those goals and we'll keep you posted as we go forward during the year on how we're doing on those goals.

So I'd like to point out the different between how CLIA, with the Clinical Laboratory Improvement Act tests, or LDTs are different from FDA regulated devices or In Vitro Diagnostics.

The LDTs, it's a quality system that's based upon inspection by the CMS under the CLIA Lab Act. And only analytical validation is required. It's currently not subject to the FDA oversight for labeling claims. The Inspections that we receive are focused on the quality of the LDTs, of the laboratory performing the test.

When you file with the FDA for a 510K or a PMA, Pre-Market Approval, your quality system is assessed by the FDA. There's clinical validation required and the clinical trials, it's best and wisest to have the FDA approval and buy-in before you start your clinical tests.

The FDA will review your claims and see if the clinical tests justify your claims. And you will likely get an inspection that's focused on the quality of the test, including the safety and performance of dependability, and you may be likely to get inspections of your actual facilities as well.

So there's a big difference between LDTs and FDA approved diagnostics. Because we do this test in our CLIA lab, we don't – it's not marketed, it's not allowed for other laboratories that are not Sequenom owned to offer the test and they're not currently subject to FDA clearance or approval. However, we are proceeding on a pathway to get IVD approval by the FDA.

So our test is an LDT. The Sequenom Center for Molecular Medicine is a CLIA certified lab for – we're cleared to perform high-complexity tests like any molecular diagnostic tests. We're in compliance with CLIA Lab Regulations and we've also been inspected by the College of American Pathologist at CAP Group.

Our tests was subjected to both analytical validation as per the LDT regulations and we did clinical validations, and

the most recent, of course, is the Genetics in Medicine Publication. And so those are well beyond the requirements for an LDT offered by a CLIA lab.

As you know, we've published in peer-review journals and we think that – and also, our study, which you'll hear a lot more about, was actually, the pioneering one was conducted by outside academic investigators.

When we think about where we are with respect to the FDA, we started our discussions with the FDA, meeting, I think it was the last business day in January. We had proposed to them a protocol, which we had sent in during the fourth quarter of 2010. We had a good and robust discussion with them. Our objective there was that we were – we were going to make a pre-market approval, application for test in the high-risk segment of the market. And one of the things that came out of it, it was very clear that the FDA would let additional clinical studies beyond the women's/infant study. They would want to have – we'd have to reach an agreement with them on the design of that. Included in that would also be a small study of the low-risk part of the population as well.

There's some real advantages to have the FDA approval of your test. You will get the FDA approved indications, you can very specifically promote those indications. Clearly, the FDA's approval of your test is a little bit like the Good Housekeeping Seal of Approval. It's not without it's disadvantages, but we think it's – it will offer big advantages to us long term on balance.

We expect to file the PMA in – sometime in 2013. It would be based upon the agreement with the FDA on the clinical trial protocols and the necessary internal testing within the laboratory environment to make sure the tests remains within the it's performance criteria.

Sequenom is a company that is – we're a high-tech company. We're very focused on building a large and defensible intellectual property physician. In the prenatal space, we have the pioneering patents where Dennis Lo is the inventor of circulating cell free fetal nucleotic acids. It's issued in the United States, it's issued also in Europe. We consider that to be our first line defense.

We have other relevant prenatal patents and applications, a rather extensive portfolio. We have two very significant patent applications that are proceeding through the offices in the U.S. and in Europe. These are the Random Sequencing or Massive Parallel Shotgun Sequencing, IP of Dr. Dennis Lo. We expect that those will go forward and will be issued.

Just a footnote, Dr. Lo's patent application, the U.S. and in Europe was 14 months as of the nearest competitor.

We have also – in the other parts of our business and related to molecular diagnostics, over 500 issued and allowed patents, and we have 330-plus patent applications. We have a very extensive intellectual property portfolio.

So at that point, I'd like to introduce Ron Lindsay, our Executive Vice President of R&D. Ron?

Ron Lindsay

Good afternoon, it's nice to see so many of you here. And in the next hour or so, what we're going to try in do is cover really four major topics. The background to the development of the MaterniT21 test, the clinical validation as published recently, the commercialization of that test, and also the utility of the test in a clinical setting. So my colleagues will go through that in some detail.

I think just to reiterate what Harry said, the purpose of this afternoon is to answer some of the more detail questions, very often investor meetings or on earnings calls, we perhaps don't have a chance to dig down to in quite so much detail. So I hope will treat this as a fairly relaxed approach to that. And I say the outset that among the presentation, there will be a certain degree of overlap because I think Harry, at the beginning mentioned several points which we believe are either misunderstandings, misconceptions. Or perhaps some areas where I think in the course of this afternoon, we can hopefully put to bed some things that are out there which we believe are either you don't fully understand or patently are not acerate. So that's really the purpose of this afternoon.

Dr. Bombard, in his talk will certainly go over in some detail current screening procedures and what the standard of care is for prenatal screening today. But I think maybe just a step back a little bit and go back to the origins of the development of a very one minute kind of survey of testing prenatally for Downs and other things. And obviously that goes back to … Some of you may know that John Langdon Down was the first to describe what was called Down Syndrome in the U.S., Down Syndrome in the U.K. And this was a paper in 1866. So the whole basis of this was to

characterize what was a very common mental retardation and many other things.

It took almost 90 years before any significant advantage of that was taken in terms of any molecular understanding of how Down Syndrome came about. And this was really the advent of carrier typing, and some may be familiar, this is a histological process where you're able to identify the individual chromosomes in a cell by taking it at a certain stage in the cell cycle.

And the first publication around the link between Down Syndrome, and trisomy was actually in the mid-50s. Although carrier typing has actually been around for quite some time, the fact that chromosome 21 is very small, they made it rather difficult to prove the point, indeed, that this extra copy of Chromosome 21, what was indeed the molecular underpinning of what causes this manifest clinical syndrome.

And I think probably it took 12 or 13 years before I think the first clinical case of amniocentesis being used, and carrier typing be used to define chromosome 21, that was in 1968. So I think, as Alan will reiterate, actually it's only since the '70s that we've had both an invasive procedure to fairly accurately to find chromosome 21, trisomy or Down Syndrome, and in the intervene period, a number of serum test have been developed, which go partially towards having a non-invasive test that's accurate. But probably not far enough. And I guess the whole rationale for what we've been doing for several years is to come up with a better non-invasive method that is close in performance to the invasive procedure.

Being a Brit, I'm always slightly interested in the history of science as well, so when I was looking up some of the original papers just to refresh myself, two things struck me. When you're developing a diagnostic test, three things that are key under CLIA. First of all you have to do an analyte, that's the thing you want to measure that you think is relevant to the disease, the disorder that you're trying to look at. You need an instrumentation platform, which could accurately reproducibly on a day-to-day basis make that measurement. And finally, in a CLIA setting, you have to do an analytical validation.

So as far as the analyte and the analyzer, being a Brit I can say this, the initial science behind this was in the U.K. where Dennis was a visiting scientist in Oxford, when he first described circulating fetal nucleic acid in maternal blood. And at the same time, and by chance I happened to visit about the same time. In Cambridge, two scientists were working in a basement on the notion of how they would improve sequencing technology and come up with so called second generation sequencing. And this was – as many people know, first discussed in a pub, as all good inventions in the U.K. are, in Cambridge. And I visited shortly after they'd been in the pub, unfortunately.

So these two things, I was unfortunate again, as a Brit I can say, a lot of the basis sound discoveries in the U.K., but rarely commercialized in the U.K. So this technology was transferred to San Diego, in two different iterations. One to Sequenom through Dennis Lowe, the other two, Illumina by the acquisition of Seleucus. So if you like, as I say here, conceived in Oxford and Cambridge, and born or delivered in San Diego, in terms of our test.

So that's certainly part of the driver for that, but clearly, along the way that the major discovery in this field, which I think was seminal, and a major scientific discovery, was the fact that there is sufficient fetal nucleic acid circulates in maternal blood, in such a way that you can use that as a analyte. And this was published by Dennis Lowe, in 1997, and somewhat modestly at the time, he said our finding of circulating fetal DNA and maternal plasma may have implications for non-invasive prenatal diagnosis. I think it's fair to say today this is a seminal discovery that led to the opening up of this whole field, and the potential to a very accurate non-invasive way to detect first of all, trisomy or chromosome 21, but as we know, probably know other trisomy's of 18, 13 and potentially other aneuploidies and other genetic variations during development.

Obviously importantly, just to stress while Lowe was – discovered this, this patent was filed at the University of Oxford, their tech transfer known as ISIS, and Sequenom has been and is the sole licensee of this patent. And we believe this is the underpinnings of this whole field, and potentially believe anybody whose developing, an approach that interrogates the circulating cell for eDNA is infringing this key patent in the field.

So that is, if you like, the analyte, is the circulating cell fetal nucleic acid. The proof of concept studies, and I think many of you know that there have been several iterations, how do I measure this analyte? There have been approaches using RNA, then have been approaches using methylation, which are still out there. And there are several different approaches uses DNA. But in terms of the approach that we have today, obviously, the generation from Selecucus of this massively power shotgun sequencing, or simply shotgun sequencing as we refer to it, had its origins in a paper, also by Dennis Lowe, where he explored this technology in 2008. The experiments were obviously

done somewhat prior to that. And a small cohort study, which is now well published. They were able to demonstrate; indeed this was potentially a very useful method to do that.

I think at the time in the mid 2000s when this was done, the cost of sequencing agents were still pretty prohibitive in terms of any commercial thoughts. But in an academic setting with a well-funded lab, this was certainly something that he, and one or two other groups were able to explore.

I think one or two of the things that became very important about this compared perhaps to earlier methods of exploring, either RNA or DNAs. DNAs very stable, therefore in terms in of being able to get samples and do the analyst, compared to RNA. And perhaps, more importantly, one of the advantages of this type of sequencing that we've discussed before, it has no ethic specificity. So this should work for one ethic background, it will be a globally useful test. And I think that's what has been proven by subsequent clinical test.

As I said, in the early days, in the mid-2000s, I think Denis initially said in his two plex format the sequencing reagents alone, not the cost of doing the test, just the sequencing reagents were over $700 per sample. This was done on the Illumina GA2x platform, several early studies were done on this, good instrument, very solid, very reproducible. But the throughput for this was certainly not to recommend itself to a large scale test. So I think what we've seen from the genesis of this is a possibility, good results is over the last two or three years, the increase in throughput with the HiSeq for example and maybe other platforms. But also in terms of the cost of sequencing reagents and potentially the cost of actually doing the whole test, of come into the realm of being commercial feasible. Still I would say pretty expensive, but I think in terms of the value of such a test, potentially is something the market can bear, to begin with.

So both the Lowe's original discovery, 1997, the proof of concept study is done by Lowe and colleagues and also by Quaken College at Stanford. I think give everybody a very firm footing this was going to be a very powerful tool in terms of initially focusing on chromosome 21, but sequentially potentially being applicable technology to other aneuploidies indeed. I think we're all very comfortable. That is the way that we're going to be able to go.

So these are the backbone, clearly as Harry said in the CLIA lab, you have to be able to have a analyte, good instrumentation, and you have to do not a clinical validation, but a analytical validation.

When we set out to do this, we felt it was very important when you were going to go into a field and potentially change the way medicine's practiced. That you would want a very sound set of clinical results to be able to convince physicians and be able to spread that message around the community in terms of patients to show that this was not just analytically validated, but very solidly clinically validated.

And in the course of this year, first of all, Lowe and colleagues paper in the British Medical Journal in January, subsequently an internal publication from Sequenom in a smaller study but looking at forty cases versus a large number of controls. And then obviously, ultimately, the recently published paper "Genetics and Medicine" where we believe the kind of study that really was blinded, fully enrolled in a way that gives you statistical confidence that this test is going to work on a day to day basis.

So I think that sort of logical progression of the discovery of the analyte, the value of sequencing as a test, and obviously the clinical performance has proven indeed that this is a very good way to go.

We've shown this slide before primarily just to show everybody how we put this together, how we built quality control measures into this process, including the measurement of the fetal nucleic acid fraction in the material plasma. Quality control and the preparation of library, quality control in terms of our sequencing results, and similarly in terms of the information technology required to analyze the results.

So this is very much what we're doing today. This is from what we used for the clinical [inaudible] study, it's also the process we have today. Our first goal certainly was to have high performance, have a test that would be commercially feasible, but clearly we're aware that at launch that the cost of goods of this test is relatively on the high side.

We're also pretty confident with things we have already put in place, and these will be touched on both by Paul and by Dirk. There are things in the wings that will significantly reduce the cost of this. Today, our cost for the whole process are about 5 to $600 per sample. We believe right upfront in terms of sample acquisition and also further downstream an automation will be applied to this.

So I think over the next eight months or so, we will see significant reduction in cost. But importantly, this is a very

robust process. And that's what we set out to do in the first place. In terms of – we kind of wrote this as a product profile a couple of years ago, but now that we have the test launched, I think we can say this actually the profile of the product itself. And the goal was a very high sensitivity, specificity test that in essence would be as close to amino as possible. And I think today the results of the study speak to define that indeed, this test is very close in terms of statistics, to amino as we know it.

We wanted this test to be applicable both in the first and second trimester. And as we go into a little more detail in a moment, clearly, in the first instance the test will be designed for a high-risk group of women who were higher risk of having a fetal aneuploidy then. The general birth population across all ages on a annual basis.

The analyte is now well defined. The launch test is being run on the Illumina HiSeq instrumentation. And the turnaround time has been geared to eight to ten days if possible, give or take, that might be shaved a little bit. But we're very comfortable that this test meets the concurrent criteria of carrier typing. So typically the results from a CVS or amniocentesis, take at least eight to ten days. So we believe this test is competitive, both in the first and second trimester with the current standard of invasive testing.

As Harry said, the test was launched on the 17 of October, and we're still carrying on, again as we said, for the path towards the PME. And all current samples will be run in our lab in San Diego.

So in terms of some of the issues we've heard from other people is why is this test being restricted to the high-risk group, are your results in the high-risk group that the study was enriched, and therefore how can you generalize this to this population. So I'd like just to take a few moments to discuss slides we've used before but with a slightly different twist.

Obviously, although the instance of the prevalence of chromosome abnormalities increases with age, in the general population of 1 in 1000, 1 in 800 across all, it's pretty hard to conceive you'd ever collect enough samples to have a statistical study. And one way to – this could run, to begin with is to look for a population where the risk is greatly increased. And obviously if one looks at either advanced maternal age, somebody already who has a positive serum screen, has a positive ultrasound, a family or personal history, [inaudible], this group enriches to about – at least increases to about 750,000.

Now, well that's certainly a fragment of the total 4.24.3 million burst in the U.S. As a diagnostic opportunity, this is almost the same size as all cancers put together. There are about 800,000 new cases of cancer in the U.S. every year, there are very similar number of women in this high-risk group. So we believe right from the get-go that a well characterized study within this group would be a very significant market segment. Once we established a test and we can discuss later, clearly we would like to eventually to have a test that would be applicable to all women regardless of age and stage of pregnancy. But I think it's important to see this as a large market segment, and a good thing to chew off, at least to begin with.

In terms of obviously Dirk is going to go into the publication and the background too in a bit of detail, but certainly one or two of the questions we've had from everybody is the design of this study valid, the statistics around this valid, etcetera, etcetera. And I'm no statistician, I want to say that straight upfront. But we have conferred with before this study was done, the PIs who designed this study are one of the epidemiologist who has a good statistical background. Just to be sure we have in the last few weeks, gone back and rechecked with some of our statisticians, just to be sure that we really are confident about this, which we have been.

The study design is called a nested case control study, and I'll show you, and there's some references in the next slide, you can all go home and chew if you want. But typically, in any indication, whether it's in a therapeutic design or a diagnostic study or the prevalence of the disease of the disorder, or the marker you're trying to identify is very low. Our statisticians have come up with over the last 20 years, perfectively valid designs that allow you take a subpopulation of cases and controls out of a cohort that you collect, and develop what's called a nested case control design.

And I just reiterate, this is a perfectively valid way it's done every day in the pharmaceutical industry, and it's something the FDA fully understands as well. So the notion that this study was enriched, I think is totally bogus.

But just to the study itself, obviously even to undertake collecting enough samples from the high-risk group, this was a study we started a couple of years ago. We wanted this to be external, we wanted it to blinded, and we wanted it to be done with people in the field who had been involved with this before. So the PIs, Glen Palomaki and Jack Canick

at Brown University have both been involved with diagnostic screening in this area for a large part of their career, and they're very experienced. Both were part of the development sum of the serum screening. So they know what they're doing. So we approached them to collect samples for the study, and the original design was going to be left up to them. We only really had two important things we wanted to do.

Oh, sorry, lets go back. Sorry. All right. So our goal was we wanted to be sure this test would be applicable in the first and second trimester. And we wanted enough samples, or enough cases in each of those two arms to have strong statistical par. So the initial goal of the study was to collect at least a total of 200 samples at 100 from the first and 100 from the second trimester. That was the fundamental goal.

At the time the PIs were elected to design the study and came up with a nested case control, in addition to these two parameters, he said, we think we'll probably run about 1000 controls. That will be sufficient for a solid nested case control study. So that was the goal.

So we set out to collect samples. And the whole thing was blinded so the academic collaborators arranged 27 sites around the world. So an importance of around the world is we've got samples from Europe, from South America. So we've got a confidence of this test works, it probably has no ethnic kind of issues in terms of it should be applicable to everybody.

The samples were shipped to the PIs where they actually stored them independently themselves. When we were ready to do this study, which really was predicated on our publication of our so-called [inaudible], that was the internal gate to move forward with this, when we were confident of the performance. We had the sample shipped to us, and Dirk will discuss the details of this as we go forward.

But clearly the goal was, this was going to be entirely blinded to Sequenom. So when ready, they shipped us a bunch of samples out of the overall collection. We did not know exactly the size of the collection, or we only knew we should be at least 100 T21s in each of the first and second trimester. That's the only data we had. So the rest of it was blinded until the study was completed in the data from the analytical site sent back to them.

I'll get this eventually, maybe by the time I'm finished. Okay. So just really to highlight this nested case control issue, you probably can't see the back, but this will be on our website. There are four references that give you background into how these case cohort and then nested case control studies have been designed, how they've validated, across both therapeutics and diagnostics.

When you design such a study, there's only really one thing that's sort of fundamental, you much have a ratio of at least four controls to each case, that's kind of a minimum. If you hopefully want to then generalize some of the results from this kind of nested case control study to the broader high-risk population.

In this case, with the number of samples we had, the PIs were able actually to match controls to cases of 7 to 1, so well above the minimum statistically required to give you what you think can then be a generalizable result into the population you collected samples.

So although you've done this at 4 to 1 match, and have run all the cohort you've collected, at least the results of that should be applicable to all of the cohort, that is, i.e. the high-risk women. So we have no qualms' in saying whatever the results in this paper, are certainly applicable to the high-risk group as a whole. If you want to check, I advise you to talk to your own statisticians.

One other comment that springs from that is the notion from some folks on the street, that this study was enriched. And that by itself is just totally a nonstarter, a non sequiter, because enrichment in a clinical study means that particularly in the therapeutic side, if you're running a clinical trial and the exclusion criteria have a very long such as certain ages, certain prior drug treatment, etcetera, advance disease. If you're excluding people and end up with a smaller cohort, that is what people consider to be enrichment. So there's nothing about the study design that pertains to enrichment. So I hope with these rather heavy handed comments, we can sort of eliminate the notion this study was either inappropriate in terms of its validity statistically, or that in any way the samples are enriched. And therefore, we believe the results from the study are applicable to the broader high-risk group as a whole.

So just in terms of the transition point to Dirk, just to give you the actual numbers. So I outlined the study design. We told you this is a nested case control study. The overall enrollment in this study was 4064 women. There were certain enrollment criteria in terms of inadequate sample, multiple gestation. So a certain number of samples were excluded from any further discussion of the study.

They had to be singled in pregnancy, so any twins for at least this part of the study were ruled. And then they were split into gestational age, so that we had the two arms of the study, the first and the second trimester samples. So the PIs that match these, so you could have this valid study designed such that they ended up with a seven to one match, and in total, 212 cases and 14,084 controls. So that was the basis of this study. And I think now I'll pass over to Dirk van den Boom, the VP R&D whose going to go into that in a bit more detail. Thank you.

Dirk van den Boom

Thank you, Ron, and good afternoon. I hope I get it right – flipping the slides. So with all the introduction, which Ron gave, what I will do is give you the highlights of the clinical study, pretty much taken out of the Genetics and Medicine paper.

And what I will cover is what I think is important to understand with this study, and also to give the foundation of what Allan is going to talk about; what is the medical utility of the test.

So aspects which are important as what is the actual study aim of when this study was designed, what were the study roles – to be really specific, who did what in this study , what is this study design. I'm just going to go in part what Ron explained, and what this may do for subsequent publications. I'll talk briefly about the analysis methods, the results, then give you a little outlook where this can go.

With that, let me talk a little bit about the study aim. If you would go back in time when we initiated the study, and contracted the Women and Infant's principal investigator, what we really wanted to do is document when we're ready, was the assay, what the performance of the laboratory developed test is in terms of sensitivity and specificity. And to make sure that we have the appropriate sample collection to make valid claims as to the clinical performance of the assay.

And of course, this is not only for trisomy 21, we can come back to that in the outlook, but the first paper focuses on fetal trisomy 21 detection using what Harry and Ron describes self re-circulating DNA in maternal plasma, and using the next generation sequencing approach.

Now, the other important aspect of this is once you have such a valuable sample collection, you can use it to validate any subsequent improvements you are going to do into the assay, and we will talk about that a little later, but it is extremely important to have the right, and appropriate sample collection for those steps as well.

The study roles, which are important as well, it's – the Sequenom Center for Molecular Medicine has developed a laboratory developed test, and in this study it was processing all the samples and then delivering the, what we call the Laboratory Director Sign-out Result, in a commercial setting, to the Women and Infant's principal investigators.

What they did, and what Sequenom Center for Molecular Medicine did not do is control the study design. We had no communication with the enrollment site, so the selection of the enrollment sites, we didn't store the samples. We delivered our sign-out results to the Principal investigators, but the study analysis was fully in the hands of those principal investigator. And of course, preparing manuscript drafts and deciding the final content of the manuscript was not in our control either.

Ron alluded to that, but I think it is important to understand that it was 27 sites, which a majority of them ex-U.S. – this is providing a sample collection which has a very broad ethnic background. So, for us this is showing clearly that we do not have any ethnic bias in the study, or any performance differences between different continents particularly related to Caucasians, or Asians…

The other part here is, and you may have seen that from the paper, while we process everything from the Sequenom Center for Molecular Medicine, there was also an independent laboratory involved at UCLA . They didn't process all the samples, but part of the samples, and you will see it later that speaks to the robustness of the assay, and provides additional valuable information for us.

So, we covered part of the enrollment criteria, but here is a little more detail on what samples were used to and collected for the study.

In general, and that's kind of the starting point, you have informed consent and you get that from individual – from pregnant mothers who are willing to undergo an invasive procedure. That's fairly important for us because that's the only way to get the outcome we want to compare against which is a karyotype.

Usually, these samples are from gestation ages of less than 22 weeks, and then the criteria for enrollment in terms of what we call high risk have to do with being screened positive. For example, by any of those three here; first trimester 'combined' test, sequential/integrated testing, or second trimester. And there are some varieties in there because with 27 enrollment sites in different continents, you will get different use of the conventional screening.

Then we also had Advanced Maternal Age, as an enrollment criteria, and abnormal ultrasound, or family history of aneuploidy.

And I will show you later that you can derive with some initial analysis that none of those enrollment criteria makes a difference on the assay performance.

Ron talked about that too, but I think it is important to reiterate that. A lot of people asked why didn't you just run all samples? We gave some guideline to the principal investigators about the total number of samples we would like to run. This is a timing question and a cost question. And in response to that, they designed the study. We were very clear, in order to have the right confidence intervals in our performance assessment, they need to at least have hundreds of trisomy 21 in the first and second trimester, and then they decided if that they will go for one-to-seven match in cases in controls. And in that, they want to match samples by gestational age, if possible, from the same center of collection. That also usually means in terms same ethnicity, same race. And they were actually able to match all of those, which is quite a feat in terms of other studies which have been published.

So, the other part, which is important to understand, we – these samples were totally randomized as they were sent to us, so we a no-timing idea what we were getting, either in the number of T-21's were, and the number of controls, or how they were arranged in any of those plates.

So Ron mentioned this – I want to go over this briefly again, the total number of samples enrolled was 4,664. Now, The Genetics in Medicine paper focused on what is called Simple Balance, and in order to give a true performance assessment of simple balance you have to exclude twins, so you focus on singles in pregnancies, and [inaudible] as well. So you find it here, grade out. Those are samples which were not considered for this part of the study design. And if you do that, you can see that we nearly run all of the Down Syndrome cases, and a total of 1,484 controlled, you see also the category of others here - we will come back to that when I get the outlook what falls in that category.

So, let's talk a little about what we used for the analysis. Ron showed this flow chart in terms of quality metrics, and I think a difference in this study to a lot of other published papers is that everything was locked when we went into the study ,like you would do in commercial practice. There were PC parameters per defined, there was a process predefined how samples come in, how they got processed. They were automated notifications so that everything was trackable, as is the case in clear laboratories in commercial practice, results get reviewed by a laboratory director, and then they get signed out.

So what you see here on the left side, that's the primary analysis method, and in real time you deliver results back to the principal investigator.

Now, in our analysis time, we pre-specified that we also have an additional analysis, which we perform after all the data had been acquired, but prior to un-blinding. And this additional analysis uses - you see normalization repeat masking, which has been described in literature as being beneficial, and we had plan to use it anyhow for other aneuploidies. So we decided to submit a data set of premature of blinding using this, and I will come back to that – what's the impact of that.

So, I'm not going to review in detail how the assay works, but I think the one part which is important to understand; how do you determine if there is a fetal trisomy 21. And what you need to do first - and that's what is published in those locked assay studies, is you need to define a reference in value. What is the chromosome 21 representation in a euploid sample in a pregnant mother with a normal fetus?

And when you do that, you do that in a lot of samples, and you get an idea what is my mean chromosome 21 representation, and what is the standard deviation of my measurement. And once you have that defined, what you can do is you can take now from a test sample, the result of the chromosome 21 representation and you can measure how many standard deviations is this away from what I observed in my reference population. And then you can define a cut up and say, if it is more than three standard deviations away, I consider this a fetal trisomy 21.

So that is kind of the core of what we used, and we had to predefine a z-score cut up – we used a z-score cut up

either equal or higher than 3 as being consistent with a fetal trisomy 21.

We also included in this study some, what we call aroba z-score, you will find that in the paper, and that's a modification of classic z-score calculations to compensate for any potential batch defect.

So with that, just top line result of the study. What you see on the left side here is, among the samples we ran for this arm of the study were a total 212 trisomy 21 samples. We detected 209 of 212 – so that 3 false negatives. And among the euploids, we had three false positives. And all in all, this gives you the sensitivity of 98.6%, and a specificity of 99.8% with very tight confidence intervals, which was the whole idea of this study, is to have enough trisomy 21's that these confidence intervals are tight.

And then also back to Ron's comment, means that a 1-to-7 match can be generalized to the high-risk population because your confidence intervals are fairly tight.

And then on the right side, you see the results from the GC normalized repeat mask data set, and you see here that we have two false negatives, and one false positive, se we increased our sensitivity to 99.1%, and our specificity to 99.9%.

The other important part here is that the overall 'No Result' rate was only 0.8%, that being critical of voices in the past from our HR paper, that there are too many samples for which you can't deliver results. In this study we had, like we had in commercial practice, two ali quarts drawn, so whenever – in order to see reason a sample fails, we can go back to the second ali quart, and run that to deliver results.

Now, I think it is important to understand what is at the core of this assay, and it will help you probably look at the results in a different way. So what I thought is good, is looking at two parameters; the chromosome 21 z score – that's what we used to say is there a fetal trisomy, and what is called the fetal fraction; the relative amount of fetal DNA versus material DNA.

What you are trying to detect is, is the fetus having an extra copy of chromosome 21, and your ability to detect that is directly correlated with the overall amount of fetal DNA have. So what we can do is plot chest the euploids here in blue, and you see all of the data points here from the controls ranging here from 4%, that's the cut off, up to 50% and you see that there is absolutely no correlation between the fetal fraction and the z score because they shouldn't. I don't have any extra chromosome 21 material, so I would not expect anything to go up here.

Then you see the three false positives here, and the mean fetal fraction, as we call it, is 13 % so there is quite a bite more fetal material then there has been originally published. And that, I think, makes probably apparent that the essay will work fairly well in general.

So, now let's focus on what we consider the trisomy 21 in red here, and you see all the data points. And clearly, the higher the fetal fraction, the higher the z score because the more fetal material I'm contributing to my measurement. And you see here there is a 15% mean in fetal fraction, so it's a little bit higher on the Down Syndrome cases, and you see here, indicates that – four data points which are below this cut of the three, one that is 2.9, and that's a sample which had a z score of 5.9 in the first run but it failed the initial volume, we re-ran it and the laboratory director considered both results to sign out this correctly as a trisomy 21.

So this already tells you that the two groups of Downs and euploids are fairly well separated but there's a different way of looking at the data, which I think makes it even more apparent.

What we have plotted here is the disease score versus the clinical interpretation on the left side here, in blue again you find the euploid data sets. And just for plotting reasons, [inaudible] plus the additional ones. Here you have all the correctly identified trisomy 21 cases and here you have the three false negatives.

I think most other companies would be happy to have a diagnostic test which separates two different groups that well.

The other part here, these are the failures. There's a total of 13 failures and the reason why we've plotted this is, you can see that if we would have singed them out, the majority would have been normal and we wouldn't have signed them out correctly.

So finally, I think this is somewhere in the appendix. Most people probably don't look at the appendix. I thought it was a good idea to show visually what does it do if you perform a GC normalization and repeat masking. So on the

left side here, you see the z-sores we had in the study for the laboratory direct to sign out. On the right side you see for the same samples, the results with GC Normalization repeat masking. And real brief, what you're doing is you're compensating for the fact that with these sequencing technologies, different regions of the genome may be over or under represented based on how GC rich they are and they're adding more variance to my measurement. And this is a way of compensating for the additional variance, similar to repeat regions, which really don't have that much value for the analysis we want to perform.

What you see here, clearly, these are the two false negatives and the one false positive. So it shows that groups are slightly better separated using that analysis method, and that's what we're using in our commercial assay.

There were questions, well, how reproducible was the assay? We have, of course, plenty of data points in house but I think it's more impressive to show how the independent laboratory did in this clinical evaluation study. So what you see here is, on the Y axis, the Chromosome 21 z-scores from the UCLA laboratory from both samples they had run and here for Sequenom Center for Molecular Medicine, you see here the R-squared is about 0.8, 0.83, which shows you that despite the fact that there are different process variants, different instruments operated with different kind of experience levels. The results come out the same and there's only one difference here where UCLA called it a positive.

So overall, I think it's an extremely reproducible assay.

Now, there's plenty of additional analysis, but I thought I'd pick out two which are important to address some of the questions which I've heard.

The first one here is, how is the fetal DNA distinguished over a gestational age? And what you see up on the blue part here, all the euploids in the fetal fraction was a trunk line her around 30% and the gestational age increasing in the X axis. And you see ,there's not clear increase between 10 weeks here and 22 weeks, it says fairly flat, which is good. That means the test is appliable in that range and you're not going to get much higher performance in the second trimester because you don't have the slope here.

There's a tiny bit of a slope here, but overall, it looks very similar between those two. It's not specifically significant.

So overall, the test is applicable from 10 weeks on in first and second trimester.

And the other part, which I think is important to look at is if you plot all the Down's Syndrome chromosome z-scores by indication for testing, for example, first trimester, screen positive for integrated screen positive for, ultrasound abnormalities. Really, there's no difference in chromosome 21 z-score, which means the indication for testing, the indication why samples were enrolled into the study has absolutely no impact on assay performance, which is important to understand as well.

So with that, a brief summary of the study. I think we have clearly shown from this is clinical validation study that we have a high-performing test with high sensitivity and high specificity compared to the gold standard.

It's applicable in the first and second trimester. No significant covariates impacting assay performance. Ron mentioned ethnicity as well, so none of these can be significantly correlated. The failure rate is very low with only 0.8% of all samples tested. We were able to confirm the performance in an independent laboratory and I think it was 8 to 10 days turnaround time, which we even met in this validation study. This is very comparable to amniocentesis and I think we can expect some improvements as we go forth.

Now, finally, to address some additional questions, we have stated publically, we also had trisomy 13 and trisomy 18 samples in this study with some of their match controlled and the principal investigators submitted the peer review publication on that. We're currently reporting on trisomy 13 and 18 when MaterniT21 is being run and we wouldn't be doing that if we were not confident in the results on those chromosomes.

There will also be future reports about twins and mosaics. When you do a performance comparison, it needs to be apples to apples. But if you want to think about this logically, I explained to you the fetal fraction is one of the determining factors for assay performance and if you consider a twin and one of the two is a euploid, the other is a trisomy 21, what happens is the euploid twin will add to the majority of euploid back from the mother. So in principle, the same will apply as long as the fetal traction is high enough the assay will detect a fetal trisomy 21.

Now, going forward, I think there's a couple of aspects we're going to improve upon. One is simplifying the sample

collection and what that means is making the draw and the shipment a little cheaper and more efficient. And then there is what we call improved assay versions, which have to do with increasing the multiplexing as the provide higher performing reagents. We have an opportunity to do so, but also automation DNA extraction preparation will benefit in terms of [inaudible] if we automate the process.

And then, of course, the assay does not just look at these chromosome which you get a result, so as we go forth, we'll look at groups, for example, aneuploidies or other trisomy.

With that, I think I hand over to Allan Bombard for the medical utility.

Allan Bombard

Thank you, Dirk. It's great to be back in New York and see so many friendly faces again. Just as a word of introduction, my guess in looking out at the audience, the vast majority of you are in your thirties and forties, probably. All of this is new.

When you were in utero, none of this technology was available, and for those of you who may have been born in the '70's may have had an opportunity, your mother may have had an opportunity to undergo basic diagnostic testing, but when this started out, the only women that were given the opportunity to have prenatal diagnosis were those women who had had an abnormal child in the past. There was a series, then published by Henry Nadler in Algerbie out of Chicago in the early '70's looking at the feasibility of Genetic Amniocentesis, Ernie Hook then Berkley and then later in Albany expanded that experience and maternal age and looking at what the various risk factors were, and so basic diagnostic testing came out and then later in the '70's Professor Nicholas McWald made the association of increased levels of MS, Maternal Serum alpha fetal protein in the blood and so it made the transition from invasive diagnostic testing to general population screening.

Fast forward ahead a few years in the 1980's, serum screening for Trisomy 21 and Trisomy 18 came on board. Erwin Merkets and Harold [inaudible] had signed up in the Bronx, made the association of low MSAFP and downs syndrome, and that set the stage for a whole variety of novel approaches for trying to identify among the general population. Those patients that are unknowingly at increased risk and would benefit from invasive testing. CVS started out when I was a fellow, '84-'86 I learned how to do CVS, that was another big milestone in prenatal diagnosis. Then, in the 90's there were a variety of different method implementations on screening first trimester/second trimester, both first and second trimester and then Kiperous Nicolaides at the Field Medicine Foundation made quite famous ultra sound examination for increases in the skin thickening behind the neck, the [inaudible]. So, all of these now were pretty much in the standard armamentarium. What options do patients have now, in the 2000's, like anything else, conformed consent and no testing, that's a perfect viable option. Minimal non-invasive screening using biochemical screening tests, targeted imaging, looking for specific anomalies or risk for anomalies by ultrasound or invasive diagnostic testing.

This slide illustrates what I mean by the different options and indications for invasive testing in the box on the left are the common reasons the physician would order an invasive test; history of neural tube defects, to get an assessment of amniotic fluid, alpha feta protein. That has largely now been replaced by targeting ultrasound in this country and others. Couples that are at risk for single gene disorders – two parents who carry the gene cystic fibrosis, [inaudible], would be candidates also for prenatal diagnosis. Where we are focusing here are on increased risk for fetal chromosome abnormalities, advanced maternal age, a positive serum biochemical screening test in the first or second trimester and ultrasound abnormalities suggestive of [inaudible] or personal or family history. For the most part, invasive testing is accomplished by either chorionic villus sampling integration he first trimester, although it can be done in the second, or Genetic Amniocentesis which is generally done from 15 weeks onward.

Current standards of care in terms of screening in the first trimester, there are a series of [inaudible] that are offered in conjunction with NT, and that provides information about risks for fetal downs syndrome and Trisomy 18. It is generally performed in either one or two visits, depending upon whether the NT examination can be performed in the physician's office or the patient has to be referred to someone who can do NT and there is a whole certification process for that in this country.

The obstetrics medical group, which is identified at the bottom and this is where this data comes from, you can see that that type of approach looking at the first trimester with a combined test will detect about 83% of babies with downs syndrome. About 80% with Trisomy 18. Second trimester risk assessment, which is probably the more common in this country, it's more common in Europe for first trimester, but we're getting there, in the second

trimester, looking at triple tests and quad tests, the detection rate is a little bit less – 81% of patients with downs syndrome, 80% with Trisomy 18, and about 80-90% with open neural tube defects are detective.

There are issues with screening tests, and Dirk has alluded to them; false positives and false negatives, a positive result with a screening test clearly does not mean that the baby is effected, and even with Amniocentesis, there is no perfect test. CVS and amniocentesis are not 100% diagnostic.

What's the goal in trying to identify an optimum test? Well, this side I borrowed from Howard Kuckle, and it illustrates where a laboratory director might decide to set a cut off to optimize both detection and minimize screen positive rate. You can see in the green, here the cut off is arbitrarily been set at about 2.5 multiples of the media. As you increase detection rate, you can see that your screen positive or false positive rate also increases. The ideal test would be all red and no blue. Screening is potentially fairly complicated. It can be done in the first trimester, it can be done in the second trimester. There are a variety of different alga rhythms that can be done in both the first and second trimester with another variety of alga rhythms. In this country, the most common form of biochemical screening for Trisomy 21 is a quad test in the second trimester, after that, a combined test, and following that, various iterations of cross trimester testing, a full integrated test that involves a nuchal translucency, a serum integrated test, which is first and second without the ultrasound component, and then the sequential test.

That all changed when Dennis Low began looking at nuchalis acids in the maternal serum, and this really in my mind is the next big change in my specialty reproductive genetics. What we have now, if you think through the data that Dirk presented and Ron alluded to, we have a very highly accurate test. It's an incredibly safe test. Just to illustrate my point, this is what we use for an amniocentesis, or a transabdominal CVS, and since most of you are my friends, I won't ask for any volunteers, but there are risks for the use of this instrument. For trans cervical CVS, I guess the Oscars are coming up, so I can ask for the envelope. This is the catheter that we use for trans cervical CVS, and I'd be happy to let you look at these after wards. I won't be responsible for any needle stick injuries. What are we replacing that with? A little butterfly needle, a [inaudible] and two tubes, so yeah, there are potential complications with [inaudible] but not like you would see with CVS or amniocentesis. A very highly accurate, effective, safe test that is easy to administer and by avoiding the invasive testing, eliminates, essentially the risk of miscarriage and certainly the anxiety that accompanies all of this.

What's the recommended flow for the test? Well, if a patient is within the high risk categories, advanced maternal age, ultrasound abnormality, positive screening test for personal family history – to quote an obstetrician, actually a [inaudible] in Denver, you will hear about some of the market research that Bill will present – "Anytime you hear about doing a CVS or an amnio, think about this test first". Yes, there are times that it's not going to be applicable, the CVS example that I used earlier, but anytime you think about doing an invasive diagnostic test, think about this test first. If the test is positive, then we advocate confirmatory diagnostic testing, there will be very few that are positive because the vast majority of all of these screening tests, maternal age, serum screening are false positives, and if it is negative, and the targeted ultrasound that is done at the same time, I think most physicians would argue that the patients really done at that point, so it makes a substantial improvement in the care of the patient.

As far as the four indications, how would you manage those individually? Advanced maternal age, patients who were forty, know they're forty at the time of conception, so at the time of the first office visit, they can be scheduled for a MaterniT21 test and have their ultrasound scheduled in advanced so they can have the result of the test at the time of their targeted ultrasound and if they're positive, have that scheduled also.

It can all be preplanned very early in the pregnancy, and the same is true for those patients with a personal or family history. They know they are at an [inaudible] risk, and it all can be planned in advanced. With an ultrasound abnormality, the time is a little bit different. An abnormality is detected at the time of the examination. The physician doing the examination would need to make available – make this information available to the patient, and could order the test, and then if the test is positive many of those will not be true positives, but can offer the patient the CVS or amniocentesis, and finally for biochemical screening, the recommendation would be to order the MaterniT21 test and the targeted ultrasound at the time it's known that the patient screened positive, schedule the targeted ultrasound, because most targeted ultrasounds aren't done at the initial time of the screening, and then if necessary, offer a CVS or amniocentesis.

What are physicians likely to do? This is probably the course of action that we will implement in my clinic at UCSE. Patients who have a negative MaterniT21 and a normal targeted ultrasound, no further action. There is always the option for invasive testing if that is decided, but I think based upon the strength of this data, and the experience of the sonographers, that will be the likely course. If either MaterniT21 or the ultrasound is positive, I think most physicians

would run an invasive test to sort that out, and then if both are positive and are consistent, probably they will use [inaudible] clinical recommendation based upon those two diagnoses, but again they can always offer confirmatory diagnostic testing.

Part and parcel of all of this is physician education. I acknowledge that's one of my responsibilities in getting the word out and we have done a number of things to start to initiate that. We have a division of medical affairs that deals with physician education – physician to physician interaction. This is not sales. This is going out and doing educational seminars and symposiums. The bottom picture happens to be a photograph of me doing an educational seminar one evening. The top, recently at the National Society of Genetic Counselors meetings, we had two physicians speaking. It was attended by over 400 physicians. It is all about getting out and getting the word out to everyone. The medical affairs is for peer to peer discussions, offering reprints and the like, and there is field based education as well. I think that concludes my series of slides. Bill?

Bill Welch

Thank you, Allan. You're always a very hard person to follow. So Bill Welch, I head the diagnostic business unit and I thought to begin with, I would first talk about diagnostic business from the people's standpoint. We're an experienced team that has experience in prenatal health, electrodiagnostics and commercial launches.

Most the field personnel have come from either prenatal genetic testing or HPV, amniocentesis testing. The organizational make-up is field sales, payer affairs folks, medical affairs that Allan mentioned, customer operations, billing support and clinical laboratories, both in Sand Diego and Grand Rapids.

We also don't list here, but we have third-party vendors to support us, primarily one to note – to acknowledge is Genetic Counseling with DNA Direct MedCo.

The group is – has been in the business since 2009 and we do, as both Allan mentioned, and Harry, CF Care Screening tests and RHD fetal genotyping. We have about 1,000 physicians we regularly call customers currently. We're building this as we go forward with MaterniT21.

So the next slide, I thought I'd share some market research. I understand the team here would like to learn how we think about the marketplace.

This study we commissioned this summer so the database was analyzed with a product that looked like AJOG, the American Journal of Obstetrics and Gynecology. I'm sorry, the American Journal of Obstetrics, yeah, and Gynecology but before the Women's and Infant's data. So regardless, we put out a product profile, they're fairly similar, and asked physicians and patients and we did one with payers as well, to understand what they thought about the product. And this comes from research done by Boston HealthCare.

So about 79% of patients with the product profile, and these are both full risk and high risk patients, we had about 300 patients in this survey, said they liked the test. It doesn't mean they'd get the test if the doctor prescribed it, but they had an interest in using that test.

And the physician's expressed over 60% interest in prescribing the test again. This wasn't the final test we brought out, this was the test we tested in the summertime.

We also tried to understand how the patients viewed the test from an out-of-pocket range because that's one thing that we really take home, is our own wallets or pocketbooks. And the biggest area for patients with this product profile expected at 200 to $600 maximum out-of-pocket range. So above $600, they thought was too high.

I personally believe that doctors do for the patient's best behalf and are in it for the care. I know that part of this is what does current practice go and how might current incentives play a role in technologies.

So we did also commission Boston HealthCare and ZS Associates when they did work, to look at the existing technologies and the caregivers that provide these. What we found was that most OB-GYN practices, they have little financial interest in amniocentesis. And for the team, the majority of the CVS amnio payments go to either the karyotyping laboratory, like the lab [inaudible] that does the karyotyping or it's the hospital or outpatient location where the procedure's performed. So that's the overhead, supplies and such. The actual physician, which would be a maternal fetal medicine specialist would be paying this fee for extracting the sample and providing it for – it's about – well, it's less than probably 10% of the overall amnio amount.

So there's also some exposure as this goes forward and we're dealing with pregnancy and risk and a number of things. This is an example of one of the quotes that a MFM said, you know, really, they hate doing amnio. You come in at different times, they take a long time ,he probably didn't say it, but you don't make much money, it's very high risk. He's willing to get out of this business.

How do you commercialize molecular diagnostics? It's as much an art as a science. There's just three big things to think about. One is coding, the next if coverage and the last is payment.

So coding simply describes the test. There's a number of things going on right now with coding reform, but really, a code is meant to relay information from an IT standpoints. The payers recognize what that is and can make an informed decision.

Coverage is, do they think it's medically necessary. So is this something they want to overall cover. And the payment is what you get.

It all starts with demand. Ultimately, the payers say, well, if doctor thought it was such a great test, I'd see a lot of orders coming in. Generally speaking, they want to see volume. They don't like to put restrictions up front, especially product payers and open-payment system. They're not practicing medicine, they're trying to see what they're displacing. If they go too early, they may be egregious and have negative pushback by physicians and the guideline communities. And if they go too broad, they're thinking maybe I left too much on the table.

So initially, they want to see how the volume goes. Our goal is a seamless system for patients and physicians to get samples in so we can engage payers, so test demand – think about it, test demand drives medical need for us and aids in the payer interactions.

I think we mentioned on the call, but for the patients at the high risk, we think of age being the highest discriminating factor, those over 34 years and older. This was a pie chart that came out of the hospital discharge rate, and it shows that about 70% of that patient population are private payers. So the goal at launch is to have a patient and provider-friendly reimbursement policy. What does that mean?

We chose the maximum out-of-pocket amount on the lower end of that scale we talked about for the patients, that 200 to 600. We show a $235 maximum out-of-pocket amount. We tell the patients, that's the most you're at risk and then we'll bill the payer. What we get is what we get. We want to engage the payers from that standpoint.

We've had a number of physicians that some of the medical educational meetings and our sales meetings said that's very stand-up of you. I know it's hard to get this overtime. If you want to engage payers, that's very good.

The next step is, what about the Medicaids or the HMOs? Those are closed systems. Kaiser is a great example of that, or any State Medicaid. They make overt coverage decisions for their beneficiaries and once they make that, then it all comes in.

So we can't take samples and build a payer when they have existing closed systems. Well, what we asked doctors to do is give us prior authorizational notifications. And with that, we can bill the HMO or the Medicaids. And we have happen to receive Medilaunch and we've been billing the HMOs and Medicaids for that. But we don't do it unless we know that they're willing to pay.

We'll walk through what the appeals process is and what initial in-network and out-of-network payers mean. But it's the way you engage the private payer system.

Who are the payers? There's many payers, frankly, and I put the top six payers by lives, but – and each one of these payers, they have various slivers, and so this would be, I don't know, 70% or so of the covered lives. Payers on the private side deem test orders by physicians as medically necessary but they treat the labs differently. So that means there's a term called in-network or out-of-network labs.

Currently speaking, CMM is an out-of-network lab. An in-network lab has agreed to cover policies, agrees to contracting, agreed to terms and payment policies. And there's a lot of benefits for labs to do that. You get a price that you agree to. The payers want that because they can know where the control. They know that this is group I contacted with you and they get information about that with you so they can control where this goes. So there's a benefit for payers and a benefit for labs.

But for labs that are out-of-network, so as for an example, if CF were out-of-network, there's a number of in-network providers for CF, they're large, national labs and they provide a plethora of tests for the major players, so they're considered in-network. We're an out-of-network lab. We get paid, but out-of-network labs typically get paid either a percent of the list price or a percent of the stack code of CPTs that are associated with that.

There's a question about technical assessments that's come up, I think by various investors and Tech Assessments don't take place normally until you have high volume of tests. An example, a Blue Cross Blue Shield might to a tech assessment to help all the various Blue Cross Blue Shields around the U.S. get commonality how the overall Blue Cross views that. It's expensive for payers to do a tech assessment. They actually don't like to do that. And they only do it when they know they can get commonality and good contracting. We don't expect tech assessment to take place initially. It will take place over time. And you don't need that to get paid.

I tried to create a pictorial in terms of how this process goes. I understand this can be complicated. And those are my PowerPoint icons, very sexy icons for the lab and also for the payer.

Essentially, the lab bills the payer for the test. We think of cycles, if you're in the out-and-upper process, and you could have multiple cycles, normally up to three. The first cycle, within 30 days, the payer will pay you based on what you bill. And that amount can be, you know, 100% of what you billed down to as low as 30%, it depends what that test may be.

Some labs, and when I say labs, think broadly, some providers, these labs generally could be hospital labs, they can be labs like ours and such. It depends on what they think that test is, how they're set up and why they want to control demand. They may stop there.

So we've heard about [inaudible] labs getting paid very little, that could be a lab that's doing a little test, not much data around that test, and maybe they're happy for what they get.

But if the lab is thinking the test is worthwhile, they will tell the payer, excuse me, you paid me less than I want, can you pay me again? And that goes through a second cycle. Payers don't like second cycles. In fact, payers even like less third cycles because you're asking them to use people, process and otherwise to intervene. And over time, you would ultimately get paid.

So an example of, can you get paid? Our current business, as I said, we're out of network CF gets paid about 65% of the list. As we go forward, I expect this to become an in-network [inaudible] for a number of payers, not all, but a number of payers, and then those in-networks will contract payment policies and pricing. So it's possible CF rate actually would go up.

So to get paid by payers, to actually have a more engaging conversation in the cycling we talked about, you might want to send them more than just, did you get my message. You might want to say, why do you think their test if medically necessary. And what that means is, documentation.

There's a number of discussions now on [inaudible] Diagnostics Book with CMS with private payers and of like. And there's not agreement in terms of what's the best policy, and this actually describes both for IBDs, I think for the diagnostics as well as for LDTs.

But for a payer to want to pay for something, they want to make sure it's significant and what's circling the street so far is peer-reviewed publications, well-designed studies and multiple information. That was the thought process between Sequenom and launching MaterniT21. We – well, I didn't have the data, but I supposed if the company got the data and was not going and didn't have the [inaudible] of Women and Infants, and wanted to go first, one could launch without a publication. And companies historically have tried to do that. I do know early on in like the genomic [inaudible] they launched before the New England Medicine Journal came out and really didn't get much traction and when that paper came out, things started happening. It's not surprising. I mean, data counts and other people's opinions count.

So we're fortunate to have at least, right now, three different papers in the shotgun sequencing and field DNA and things of that nature. This is a rich area for research. I expect more going forward, and payers know that. So this is good news and we have things to engage them on.

How do we think about the marketplace? Okay, well, there's a lot of OB-GYNs and not so many MFMs, but about 2,500. And the associate genetic counselors that work with the OB-GYN's in high volume. We've engaged the market

research as you see on this slide, to do a number of work for us and to stratify. So we bought things like scripts by physicians and essentially find out where they were, how many doctors matter beyond the 80/20 rule, you know, how many did they hit. And it turns out in this marketplace, about 7,500 physicians represent the lion's share of where we need to go. And again, as OB-GYNs and MFMs.

So we launched MaterniT21 in 20 major metropolitan regions and that can provide approximately 66% reach. Reach is a way to say a physician in those groups could actually get samples and send them to us.

Now, I agree, it's not the perfect solution, you're not seeing that doctor on an every-month basis with the number of reps we have, but the ability for physicians to access us, we have access in about 66% of the target market at launch. Remind us that we have 1,000 customers right now on our current system and we're growing. We do understand that over time, sales for expansion will take place and so we've done a number of different analysis by our sales anlaysis vendor and they came up with about an 80-representative sales force can get a majority of the 7,500. Overtime, we think we could get up to about 80 reps. You wouldn't want to have 80 reps right now, but that's a place, in a couple of years you could see that going.

So we would be adding reps both in the major 20 regions, so when you're in L.A. or something, California, you probably ought to be in multiple places in California and then we want to go to the gray areas, those places we don't touch at all today, so the non-20 major regions.

A number of things we put out on the education program, including our website, and I would just say it's important to recognize at launch, we were blinded by the data. The test request form, or the actual MaterniT21 test form shows the data in it embedded. And so, you can imagine the amount of work that went on internally for a select group of people to keep the data quiet, confidentiality, and still get the things we needed to go forward. So I think we did a tremendous job.

The day we launched, we were to get – we had a printer who was under CDA. It was quite amazing. So this information started flowing just three weeks ago. The website went up and the three big bullets – well, actually, Allan's simple four-bullets, why would you [inaudible], it's clear, it's convenient and it's compelling.

On top of the friction system, that's really the name of the game with doctors and patients. We need to get the samples in and part of that starts with a test request form. That simply is a – think of it like a prescription. But what we need from the lab is the patients billing information, who they are, and if the doctor – why they need that. Why they need it is important to engage the payer if we have document right there with this medical signature that this is why the test was requested.

And then we have a number of things in terms of how you get the blood drawn, where you go, and other information from the doctor to the patient. So simple logistics is a key issue.

Simplifying billing. Billing is an important thing. So we – this is a snapshot of our billing guide to be provided to both providers and to patients and encourage them to call our 800 number.

So I was asked to give some market feedback. It's been three weeks, it's early, but I'm proud. I think we're on the – definitely in the right direction. As we said, we launched on the 17th and the documentation started to flow at that point in time. So we set out the test requests forms, the patient information and those kinds of things. I thought it would take us a week at least to get a sample in. We actually got a first one in within 2 ½ days. That was terrific.

It seems though, it seems as though the clinical data has been well received by physicians and genetic counselors and Allan, I'll show the bottom of this. It was just serendipitous but October 27th, the NSGC, National Society of Genetic Counsel was in San Diego and we had a bototh, we were ready to go and we had a seminar, [inaudible] seminar, 400 people at our seminar. So out the door [inaudible] is pretty amazing.

And at booth, we're six rows deep. So it just goes to show, in healthcare, Dana Trump sizzle, I mean, with people who – the big pharma communities, or big diagnostic companies coming by asking what's going on . So it was pretty exciting.

And the reimbursement, so far, it appears to be well received, and we have bill payers. Again, we were well within the first cycle of the 30 days. What do I think? I think much like other, [inaudible], we'll get paid a percent, 100% to a lower percent. It will vary by payer, very by region and it will be bumpy roads. So we'll be working to get this worked

out, hopefully through contact or consistent messaging all through next year and Paul will walk through a number of those things to think about the financial implications.

I believe that's my last slide, so thank you very much.

Paul Maier

Thank, you, Bill. We've had quite a few questions about the economics of commercialization. As you've seen, reimbursement is a complex process, so I will translate some of these terms that you've heard our panel discuss earlier into what we believe the implications will be for the company.

Now, with only 3 ½ weeks under our belt marketing this test, it's a little bit early to go ahead and extrapolate what we might expect for 2012. And I want to emphasize this is not guidance. But what we've thought would be helpful for you was to depict three different adoption curves that we might look at in the coming year.

And so, what you have on this axis is the quarterly volume and then the annualized volume is over on the right.

We intended when we launched the product to have in place the capacity to do 100,000 tests. We have that sequencing capacity in place. So if you look at the 60,000 unit, or the high scenario, by the fourth quarter of 2012, we would be going at a run rate of about 100,000 capacity. So that's the first thing we wanted to have in place.

Then if you look at the infrastructure that we need, the customer service, the sales order processing, the logistics, the reimbursement specialists, field sales force, regional managers for the field sales force, all of that has been in place going back as far as two years ago and we believe with coverage of about 2/3s of the physician market that's our target market will be positioned to be somewhere in the range of these three curves next year. That's not guidance.

And what we have said all along, and Bill just reaffirmed that, is we will add resources to our sales force as the adoption occurs. So it allows – we will be able to do the same thing as well with additional capacity and it allows us to moderate the financial implications of this and we also realize that it will take some amount of time to have contracts in place. And so we want to make sure that we are very careful in husbanding our resources as we move forward.

You've seen this slide earlier, but we've added a couple of points to it. The maximum co-pay for those who have insurance, as Bill mentioned, is $235. We will collect that fee up front when someone comes in to take the test.

And as well, we do expect to get reimbursement with our other tests that we launched as far back as the fourth quarter of 2009. The reimbursement occurred on the majority of those tests and it started to come in with in that 90-day windows. So there is a lag from the time we bill until the cash comes in the door. And in the case of MaterniT21, we may go through several cycles, so it will come in some separated and distinct inflows.

We do expect that for our other tests, we will move to accrual accounting in the fourth quarter of 2011 and for that MaterniT21 test, we will move to an accrual accounting at the end of 2012 with the caveat that as we put major contracts in place where we will have reimbursement levels certain, we will be able to recognize those payors on an accrual basis.

So you will see during 2012, as those contracts are in place, some element of accrual accounting for T21.

We also recognize that all of you would like to know, well, how many tests have you done. Well, we're not going to tell you today how many tests we've done, but we do expect at the end of every quarter, we will let you know how much has been billed to give you some indication of what that adoption looks like.

So this may appear to be a busy slide, but it has a pretty basic and fundamental principle. And that is, how the costs flow in and out of a company. And we'll use the example of next year on January 1, we perform a test and it would take about 8 to 10 days for that result. When that result is provided, the billing action occurs so that the carrier will receive a bill. When the patient had the – a blood sample, if there was a co-pay involved, we would receive that patient's copay up front.

Sometime within the next 90 days, we would expect to get the first payment from the payer. And that would be based on the initial billing. Meanwhile, the cost of processing the sample and running the sequencing, that hits up front. So that cost very much is here. You won't find out about the number of tests that we conducted in the prior period until

we announce our results. So there'll be a lag for the reported test volume but the costs that were incurred in that quarter will also show up at the end of every quarter.

So there is no way that you can figure out what our average selling price is by looking at any cash receipts that we receive during that quarter and compare it to the cost we've incurred during that period. And this is a fact of life. It happens to all other diagnostic tests when they go through their initial launch cycle and we will try to provide as much information as we can to help you understand what the dynamics are here.

If you look further out in the year when we do additional billings and appeals with the carriers, that could take up to 180 days by the time we resolve the final payment for that individual test. So again, you may not like it, we don't like it either. It's one of the complications of how we have to operate. But it doesn mean that despite – this is Generally Accepted Accounting Principles when we use cash accounting, but ironically, the costs and the revenues are not matched and so during 2012, we'll have to work together to try to understand what the direction is going.

I think the gross margin, initially, will appear to be low because of this artificial higher cost and lower revenues. And that's the reality of the timing offset here. We do except that by the end of 2012, we will be on accrual accounting, for T21 and that as contracts are put in place, we will add some portion of that during the year, hopefully, that will also be done on an accrual basis.

Again, if you try to calculate the average selling price during the year, you will not be able to do that based on the data that you see in our externally reported financials.

And the other reality is, there will not be a accounts receivable on our balance sheet until such time as we do adopt accrual accounting, either by payer or for the whole system.

Another way to look at this is the adoption curve in the blue line here shows clearly the buildup of the tests that we perform. We booked the costs all along as we provide testing services and we report on a quarterly basis the unit volumes and those costs. And then you see the green area of the curve here reflects what we believe may depict the cash receipts cycle and on an individual basis, payers contract with us with a contract rate and reimburse us, that will do two things. One, it will allow us to use accrual accounting and secondly, it will speed up the cash receipts. We talked about 90 days when we're out of network initially at launch, we have very good experience with the payers for our CF tests that once they get in the rhythm and even though we're not on contract with any of them, they pay a lot better. So somewhere in the 45 to 60 day range should occur during the year. So a lot of moving parts here.

When we do implement at the end of the year as our anticipated implementation of accrual accounting, you'll see one big lump that flows into revenue and so there'll be a one-time hit. This revenue relates to services we performed throughout the year, but in one quarter, there will be a big bump. And again, that will be a one-time distortion, but going forward, after that's implemented, then we'll be able to match up the costs and the revenues and we'll have a good idea and you'll have a good idea of what our average selling price is for the test.

Another area we receive a lot of inquiry is in the cost of goods. And this is a very complex calculation. It may be simple for you and you try to translate it into a model, and of course, in the first quarter, or even the first two quarters after the initial launch, we probably don't have a representative cost. There are a lot of elements that go into it. Once we get into the volume of the adoption curve that smooths out a little bit, then we have a more normal cost of goods.

So the guidance that we have been giving all along haven't changed. We expect at some point in the coming year that we'll be in the 500 to $600 range per test for our cost of goods.

These are the major components of the cost. And they all are – all of them except the royalty rate will change over time. The royalty rate, we're not able to disclose the actual rate, but the royalties in total are in the high single digits.

Those are based on cash receipts. So again, we will pay as you go on that. As we receive cash, we'll pay royalties. And that will increase over time, particularly as we go to accrual accounting. But as a percentage of revenue collected, it is a constant.

The logistics and shipping is a very large area but with some of our improvements that we expect to implement next year, that will be one of the largest areas of opportunity for decrease.

Labor varies directly with the test but right now we have labor in place to do more tests than we're actually receiving because, again, we need to have the capacity in place. So the more tests volume that we provide through our labs,

the lower the unit labor costs is and the same phenomena occurs with lab overhead and equipment depreciation.

So if we look at what would we expect during the next 12 to 18 months in the cost of goods, we anticipate, excluding royalties that we will achieve somewhere in the range of a potential 30 to 40% improvement on the cost. And if you look at the smaller pie chart here, the reagents appears to be bigger and that's primarily the reagents don't come down as quickly as the other costs do. So as in proportion to the whole reagents, relatively speaking, are a little higher.

Logistics and shipping is a very key area for saving. The equipment and labor and that will also improve. So you see, we have a number of the anticipated improvement. Ron and Dirk talked about them, increased multiplexing, our vendor – primary vendor has over the past continuously improved the – enhanced the reagents and the flow cell performance, we also are in the process of working on automating sample preparation and some other process improvements. The collection tube in the future would be – our goal is to have an ambient temperature for shipment, that reduces the logistics and the handling costs considerably. And then as I mentioned, our overhead absorption improves as volume increased.

So it's a very complex formula, truly the cost of goods is changing continuously. We expect it will in the future but even given the high cost up front of 500 to $600, with the revenue expectations we have, this will, in the long term, be a very profitable test for us.

We had questions about why would we want to expand and build another facility? Well, a few comments on that.

One, right now the San Diego facility is our only CLIA lab that's equipped for sequencing. It has capacity limitations. We expect that will expand as we improve the plexing and the reagents. However, California is – has some risks that maybe don't exist in the rest of the world. The labor cost is very high. And so, long-term, as we improve our penetration of the market, we do intent to have a lower cost facility. We need a backup to the San Diego lab and so we did a pretty exhaustive research on this and we selected North Carolina for a number of reasons.

One, there is good availability of lab personnel and they're experienced. The cost of that lab personnel is considerably cheaper than California. The cost of facilities in the rent and the occupancy costs and even some of the utility costs are lower.

We have the ability because of the market dynamics to have a landlord that will fund some of the investments in the building and we're in the process of negotiating the lease as we speak, so we're close to have that put in place.

And there's lead time in getting – as most of you may know, in getting a facility on board. So when we pulled the trigger on this, we knew it would be at least a year before it would actually be on stream. So we felt we better get started now.

One of the press releases you may have read in October, the state of North Carolina, through the Governor's office issued a press release, they said they welcomed us to the state. We would be providing 242 jobs and spending over $18 million.

Well, that information was included in a proposal that we submitted to the state in order to acquire some incentives to come to this state of North Carolina and we hadn't made a decision at that point. And if we're successful, we will hire a number of people, but that's staged over a number of years.

In terms of the investment that would go into the state, the landlord will help us with that investment. We don't need anywhere near the majority of that in up front. In fact, this is a gated investment path where we'll put a small amount of capital in up front to get the facility built and operating and as we put the sequencing capacity in place, we can do that. So we're in control of the timing, much like we are with the sales force build and the investment in sequencing equipment for or San Diego lab.

So all of these things are within our control and they're part of our long-term plan.

As our other tests grow and as we build additional capability through future test development or in licensing or acquisitions.

The North Carolina facility is a perfect location for further expansion of some of our other tests. So it has enough square footage to accommodate long-term growth.

I think many of you are familiar with our financials since we recently announced our third quarter results. Harry mentioned earlier our revenue in the first nine months was 40 million. We're up from last year at a consistent rate. Our cash at the end of September was over 100 million and our burn rate was 45.6 million for the first nine months. And that's the gross burn rate because with the credit facility we have in place, our actual cash balance didn't grow by that amount.

So what is our current profile? I mentioned the over 102 million in cash at the end of the third quarter. We have a 30 million credit facility that we put in place earlier this year. Primarily, the 20 million portion is for capital equipment which we have utilized 12 million of that by the end of September. We have working capital credit line, which we can use for our receivables and inventory and we haven't utilized any of that yet. We would anticipate maybe next year as we are – our growth rate picks up from MaterniT21. We might use that. And we expect our existing cash to fund our operations into early 2013.

As I mentioned, on a couple of occasions, the investment in our expansion initiatives will be gated by the adoption rate of MaterniT21 tests. So we have some ability to ratchet that up or down as the case may be. But we do expect, and we've said this for quite some time now, we do expect to do an additional capital raise sometime during 2012.

With that, I'll turn it over to Harry to wrap up.

Harry Hixson

Thanks, Paul, and thanks to Ron, and Dirk, and Allan, and Bill. We've tried to – as I said in the beginning, there was some questions that had been posed to us in the period since the launch. We tried to make a comprehensive presentation to answer all of these particular topics and we hope that we have. If we have not, we're going to have – after a 15 minute break, we're going to have the Q&A session and you can probe further into these topics or other topics that you have in mind.

So once again, thank you for your attention and we'll take a 15-minute break and then we'll go to Q&A. Thank you.